

WHAT IS CLAIMED IS:

1. A device for the analysis of one or more samples, comprising:
a plurality of separation units, each separation unit including an inlet end and an outlet end and an interior portion between the inlet end and the outlet end;
an excitation source adapted to direct an excitation beam of light along a beam path that intersects the interior portion of each of the separation units at a region between the respective inlet end and the outlet end; and
an emission detection system optically coupled to the interior portion of the separation units, in the vicinity of the beam path,
wherein at least a portion of one or more of the plurality of separation units comprises a non-fluorescent quencher.
2. The device of claim 1, wherein the at least one portion comprises an optical coating or element disposed on one or more regions of the separation units.
3. The device of claim 1, wherein the portion comprises a cover member positioned over the interior portions of the separation units.
4. The device of claim 3, wherein the cover member comprises an optical coating or element on the cover.
5. The device of claim 1, wherein the non-fluorescent quencher comprises a pigment.
6. The device of claim 1, wherein the separation units do not intersect one another.

7. The device of claim 1, further comprising first and second reservoirs disposed for fluid communication with the inlet ends and the outlet ends, respectively.

8. The device of claim 1, wherein the excitation-beam source comprises at least one laser source.

9. The device of claim 8, wherein the device further comprises a substrate, the separation units are formed in the substrate, the substrate comprises first and second lateral sides, the beam path extends between the first and second lateral sides, and the at least one laser source is configured to emit a beam that enters the device along the beam path from each of the first and second lateral sides.

10. The device of claim 9, wherein the substrate includes a transparent region between the first and second lateral sides, and wherein the beam path extends along the transparent region.

11. The device of claim 1, wherein each separation unit includes opposed sidewall regions that include portions that are substantially parallel to one another.

12. The device of claim 11, wherein the beam path extends through the parallel portions.

13. The device of claim 12, wherein the parallel portions through which the beam path extends are transparent to at least a selected wavelength range of light.

14. The device of claim 1, wherein the device further comprises a substrate, the separation units are formed in the substrate, the substrate includes a transverse channel transverse to and passing through each of the plurality of separation units, and the beam path extends through the transverse channel.

15. The device of claim 1, wherein the non-fluorescent quencher is coated on one or more portion of one or more of the plurality of separation units.

16. The device of claim 1, wherein the separation units are at least partially defined by a material, and the non-fluorescent quencher is disposed in the material.

17. The device of claim 1, wherein at least a portion of one or more of the plurality of separation units comprises a reporter dye, wherein the reporter dye includes FAM, and wherein the non-fluorescent quencher includes at least one of Methyl Orange, Disperse Red 13, Basic Violet 14, Basic Red 9, and non-fluorescent dyes having an absorbance with a λ -max at about 520 nm.

18. The device of claim 1, wherein at least a portion of one or more of the plurality of separation units comprises a reporter dye, wherein the reporter dye includes ROX and wherein the non-fluorescent quencher includes at least one of Malachie Green, Ethyl Violet, Fast Green FCF, Brilliant Green, Crystal Violet, and non-fluorescent dyes having an absorbance with a λ -max at about 605 nm.

19. The device of claim 1, wherein at least a portion of one or more of the plurality of separation units comprises a plurality of reporter dyes and a plurality of non-fluorescent quenchers, wherein the plurality of non-fluorescent quenchers includes at least two non-fluorescent quenchers with different λ -max absorbance values.

20. A device for the analysis of one or more samples, comprising:

a substrate;

a plurality of adjacently arranged channels formed in the substrate, with each channel having an inlet end and an outlet end, the channels being disposed spaced apart from one

another, with each adjacent pair of channels being separated by a respective portion of the substrate that includes at least a region that is transparent and at least a region that comprises a non-fluorescent quencher; and

an excitation-beam source adapted to direct an excitation beam of light along a beam path that intersects each of the channels at a region between the inlet and outlet ends and further intersects the transparent region of the substrate separating adjacent pairs of channels.

21. The device of claim 20, further comprising a cover member positioned adjacent the substrate, over the channels.

22. The device of claim 21, further comprising an emission detection system optically coupled to a region within each channel along the beam path.

23. The device of claim 20, wherein the substrate is a plate, slide, wafer, or chip comprised at least in part of an optically clear material.

24. The device of claim 20, wherein the substrate is a monolithic structure.

25. The device of claim 20, wherein the substrate is a multi-laminate structure.

26. The device of claim 20, wherein each channel includes opposed sidewall regions including portions that are substantially parallel to one another.

27. The device of claim 26, wherein the transparent region comprises, at least in part, the parallel portions, and wherein the beam path extends through the parallel portions.

28. The device of claim 20, further comprising a coating on one or more portion of the plurality of separation channels, wherein the coating includes the non-fluorescent quencher.

29. The device of claim 20, wherein the non-fluorescent quencher is incorporated into the substrate.

30. The device of claim 20, wherein at least a portion of one or more of the plurality of separation units comprises a reporter dye, wherein the reporter dye includes FAM, and wherein the non-fluorescent quencher includes at least one of Methyl Orange, Disperse Red 13, Basic Violet 14, Basic Red 9, and non-fluorescent dyes having an absorbance with a λ -max at about 520 nm.

31. The device of claim 20, wherein at least a portion of one or more of the plurality of separation units comprises a reporter dye, wherein the reporter dye includes ROX and wherein the non-fluorescent quencher includes at least one of Malachie Green, Ethyl Violet, Fast Green FCF, Brilliant Green, Crystal Violet, and non-fluorescent dyes having an absorbance with a λ -max at about 605 nm.

32. The device of claim 20, wherein at least a portion of one or more of the plurality of separation units comprises a plurality of reporter dyes and a plurality of non-fluorescent quenchers, wherein the plurality of non-fluorescent quenchers includes at least two non-fluorescent quenchers with different λ -max absorbance values.

33. A device for the analysis of one or more samples, comprising:

a substrate including one or more regions, the one or more regions including a material that comprises a non-fluorescent quencher;

a plurality of adjacently arranged channels formed in the substrate, wherein each channel includes an inlet end and an outlet end and the channels are disposed in spaced

relation relative to one another, with each adjacent pair of channels being separated by a respective portion of the substrate;

a transverse channel in the substrate transverse to and passing through each of the plurality of adjacently arranged channels in the substrate; and

an excitation-beam source adapted to direct an excitation beam of light along a beam path that intersects each of the channels at a region between the inlet and outlet ends, wherein the beam path is along the transverse channel.

34. The device of claim 33, wherein at least a portion of the substrate in each of the separation channels includes a non-fluorescent quencher dye.

35. The device of claim 33, wherein the separation channels are non-intersecting.

36. The device of claim 33, wherein the substrate is a plate, slide, wafer, or chip; and wherein the separation channels are microfabricated therein.

37. A device for the analysis of one or more samples, comprising:

a plurality of sample-containment units, each sample-containment unit including an open end and a closed end and an interior portion between the ends;

an excitation source adapted to direct an excitation beam of light along a beam path that intersects the interior portion of each of the sample-containment units at a region between the open and closed ends; and

an emission detection system optically coupled to the interior portion of the separation units, in the vicinity of the beam path,

wherein at least a portion of one or more of the plurality of sample-containment units comprises a non-fluorescent quencher.

38. The device of claim 37, further comprising an optical coating or element on one or more regions of the sample-containment units.

39. The device of claim 37, further comprising a cover member positioned over the sample-containment units.

40. The device of claim 39, further comprising an optical coating or element on the cover.

41. The device of claim 37, wherein each sample-containment unit is continuous from its open end to its closed end.

42. The device of claim 37, wherein the units comprise separate respective sample vials.

43. The device of claim 37, wherein the excitation-beam source comprises at least one laser.

44. The device of claim 43, wherein the device further comprises a substrate, the substrate comprises first and second lateral sides, the beam path extends between the first and second lateral sides, and at least one laser is configured to emit a beam that enters the device along the beam path from each of the first and second lateral sides.

45. The device of claim 44, wherein the substrate includes a transparent region between the first and second lateral sides, and the beam path extends along the transparent region.

46. The device of claim 37, wherein each sample-containment unit includes opposed sidewall regions including portions that are substantially parallel to one another.

47. The device of claim 46, wherein the beam path extends through the parallel portions.

48. The device of claim 47, wherein the parallel portions, through which the beam path extends, are transparent to at least a selected wavelength range of light.

49. The device of claim 37, wherein the device further comprises a substrate, and the substrate includes at least one transverse channel transverse to and passing through at least some of the plurality of units, and wherein the beam path extends through the transverse channel.

50. The device of claim 37, wherein the non-fluorescent quencher is coated on one or more portion of one or more of the plurality of separation units.

51. The device of claim 37, wherein the non-fluorescent quencher is incorporated into the sample-containment units.

52. The device of claim 37, further comprising a substrate, wherein the sample-containment units are an array of sample-containment units that are adapted to be placed into the substrate.

53. A method of forming a device, comprising:
providing a substrate material and a non-fluorescent quencher;
forming a substrate from the substrate material and the non-fluorescent quencher, wherein the substrate includes a plurality of adjacently arranged channels, each channel having an inlet and an outlet end, the channels being disposed in spaced relation to each other.

54. The method of claim 53, further comprising coating at least a portion of the substrate with a coating material, wherein the coating material comprises the at least one non-fluorescent quencher.

55. The method of claim 53, further comprising:
mixing the substrate material with the at least one non-fluorescent quencher.

56. The method of claim 53, further comprising:
retaining one or more non-fluorescent quenchers in alternating channels of the plurality of adjacently arranged channels.

57. A method of forming a device, comprising:
providing a substrate material and a non-fluorescent quencher;
forming a substrate from the substrate material and the non-fluorescent quencher, wherein the substrate includes a plurality of adjacently arranged separation units, each separation unit having an inlet and an outlet end, the separation units being disposed in spaced relation to each other.

58. The method of claim 57, further comprising coating at least a portion of the substrate with a coating material, wherein the coating material comprises the at least one non-fluorescent quencher.

59. The method of claim 57, further comprising:
mixing the substrate material with the at least one non-fluorescent quencher.

60. The method of claim 57, further comprising:
retaining one or more non-fluorescent quenchers in alternating separation units.

61. A method of forming a device, comprising:

providing a substrate material and a non-fluorescent quencher;

forming a substrate from the substrate material and the non-fluorescent quencher, wherein the substrate includes a plurality of sample-containment units, the sample-containment units being disposed in spaced relation to each other.

62. The method of claim 61, further comprising coating at least a portion of the substrate with a coating material, wherein the coating material comprises the at least one non-fluorescent quencher.

63. The method of claim 61, further comprising:

mixing the substrate material with the at least one non-fluorescent quencher.

64. The method of claim 61, further comprising:

retaining one or more non-fluorescent quenchers in alternating sample-containment units of the plurality of sample-containment units.